UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/004,097	10/31/2001	Bogdan Jakobik	2585-000008	9329

27572 7590 09/22/2004

HARNESS, DICKEY & PIERCE, P.L.C.
P.O. BOX 828
BLOOMFIELD HILLS, MI 48303

EXAMINER	
LEE, DAVID J	

ART UNIT	PAPER NUMBER
2633	

DATE MAILED: 09/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/004,097	JAKOBIK ET AL.	
	Examiner	Art Unit	
	David J. Lee	2633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *31 October 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *02/03/2004*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Specification

1. Claim 26 is objected to because of the following informalities: "multiplexers" on the line 4 of claim 26 should be changed to "demultiplexers". Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-5, 10, and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Nakamoto et al (US Patent No. 6,738,181).

Regarding claim 1, Nakamoto teaches an optical sending apparatus (col. 2, line 45 and fig. 7, 108) being constituted in a layered member relationship that defines at least two optical layers (col. 13, lines 16-18 and fig.4, 121-1 to 121-m). The apparatus comprises: an optical transport line (fig. 7, along 102-1) operable to carry an optical system signal; multiplexing components (fig. 7, 144-1 to 144-8) operable to receive a plurality of optical data signals (fig. 7, 141-1 to 141-15) to form an optical system signal and launch the optical system signal into the optical transport line (fig. 7, 102-1); and a plurality of signal impairment compensation mechanisms operable across each of the optical layers (fig. 7, 142-1 to 142-15).

Regarding claims 2 and 10, Nakamoto discloses polarization-maintaining dispersion compensating sections (PMDCS) (col. 19, lines 39-40 and fig. 7, 142-n) as the signal impairment compensation mechanism.

Regarding claim 3, Nakamoto teaches a set of multiplexers (fig. 7, 144-1 to 144-8) operable to receive the plurality of optical data signals (fig. 7, 141-1 to 141-15) and combine the plurality of optical data signals to form a plurality of intermediate optical signals, and a system level multiplexer (fig. 7, 144-8) operable to receive the plurality of intermediate optical signals and combine the plurality of intermediate optical signals to form the optical system signal.

Regarding claim 4, Nakamoto teaches that the signal impairment compensation mechanisms are positioned at one or more inputs associated with the set of multiplexers (fig.7, 142-1 to 142-15), at one or more inputs to the system level multiplexer (fig. 7, 142-6, 142-10), and at an output of the system level multiplexer (col. 16, lines 53-56 and fig. 6, 132). The optical amplifier 132 is a signal impairment compensation mechanism because it compensates for signal loss by amplifying the signal.

Regarding claim 5, Nakamoto teaches a method for transporting optical signals in an optical transport network, comprising: receiving a plurality of optical data signals (fig. 7, 141-1 to 141-15); performing signal impairment compensation on each of the plurality of optical data signals (fig. 7, 142-1,2,4,5,7,9,11,12,14,15, 143-1 to 143-5); selectively combining the plurality of optical data signals to form a plurality of intermediate optical signals (fig. 7, 144-1 to 144-7); combining the plurality of

intermediate optical signals to form an optical system signal (fig. 7, 144-8); and launching the optical system signal into the optical transport network (fig. 7, 102-1).

Regarding claim 11, Nakamoto teaches a step in performing signal impairment compensation on the optical system signal (col. 16, lines 53-56 and fig. 6, 132).

4. Claims 12 - 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Milton et al. (US Patent No. 6,631,018).

Regarding claim 12, Milton teaches a layered network architecture for use in an optical transport network, comprising: a first optical transport line operable to carry an optical system signal therein (fig.4, 2), the optical system signal being constituted in a layered membership relationship from a plurality of optical data signals (fig. 4, optical data signals from band 13 and band 17 are multiplexed to form the optical system signal); a second optical transport line operable to carry the optical system signal therein (fig. 4, 13); a third optical transport line operable to carry the optical system signal therein (fig. 4, 12); and a network switching site interconnecting the first optical transport line, the second optical transport line and the third optical transport line, where the network switching site includes a demultiplexing component (fig. 4, 10) connected to the first optical transport line, the demultiplexing component operable to receive the optical system signal and to separate the optical system signal into a plurality of optical band signals (fig. 4, 13, 12); and an optical switch (fig. 4, 115) operable to route at least one of the optical band signals amongst the second and third optical transport lines.

Regarding claim 13, Milton teaches a multiplexing component (fig. 4, 11) associated with at least one of the second optical transport line and the third optical transport line, where at least one of the plurality of optical band signals is manually routed without the use of a switch from the demultiplexing component to the multiplexing component (fig. 4, from demultiplexing component 10 to multiplexing component along band 13).

Regarding claim 14, Milton teaches a sub-band level demultiplexing component (fig. 4, 19) connected to the demultiplexing component (fig. 4, 10), the sub-band level demultiplexing component operable to receive the plurality of optical band signals (fig. 4, 12) and to separate the optical band signals into a plurality of optical sub-band signals (fig. 4 – note that the demultiplexing component separates the band signals into a plurality of individual wavelengths); and a sub-band level optical switch (fig. 4, 115) operable to route at least one of the optical sub-band signals amongst the second and third optical transport lines.

5. Claims 12, 14, and 16 are rejected under 35 U.S.C. 102(e) as being anticipated by Jerphagnon et al. (US Patent No. 6,778,739).

Regarding claim 12, Jerphagnon teaches a layered network architecture for use in an optical transport network, comprising: a first optical transport line operable to carry an optical system signal therein (fig. 8 – the Fiber M runs along the transport line), the optical system signal being constituted in a layered membership relationship from a plurality of optical data signals (col. 7, lines 15-16); a second optical transport line

operable to carry the optical system signal therein (fig. 8 – the second optical transport line is a result of demultipexing the first transport line); a third optical transport line operable to carry the optical system signal therein (fig. 8 – the output fiber runs on the third transport line); and a network switching site interconnecting the first optical transport line, the second optical transport line and the third optical transport line (fig. 8, 100), where the network switching site includes a demultiplexing component (fig. 8, 103a) connected to the first optical transport line, the demultiplexing component operable to receive the optical system signal (fig. 8, Fiber M) and to separate the optical system signal into a plurality of optical band signals (fig. 8 – the demultiplexing component 103a separates the signals of Fiber M into a plurality of band signals); and an optical switch (fig. 8, 10c) operable to route at least one of the optical band signals amongst the second and third optical transport lines.

Regarding claim 14, Jerphagnon teaches a sub-band level demultiplexing component (fig. 8, 103b) connected to the demultiplexing component (fib. 8, 103a), the sub-band level demultiplexing component operable to receive the plurality of optical band signals and to separate the optical band signals into a plurality of optical sub-band signals (fig. 8 – sub-band level demultiplexing component 103b separates the optical band signal into a plurality of optical sub-band signals); and a sub-band level optical switch (fig. 8, 10b) operable to route at least one of the optical sub-band signals amongst the second and third optical transport lines.

Regarding claim 16, Jerphagnon teaches a wavelength level demultiplexing component (fig. 8, 102) connected to the sub-band level demultiplexing component, the

wavelength level demultiplexing component operable to receive the plurality of optical sub-band signals and to separate the optical sub-band signals into a plurality of optical wavelength signals (fig. 8 – the wavelength level demultiplexing component 102 separates the sub-band signal into different channels of wavelengths); and a wavelength level optical switch (fig. 8, 10a1, 10a2) operable to route at least one of the optical wavelength signals amongst the second and third optical transport lines.

6. Claims 17 and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Bergano.

Regarding claim 17, Bergano teaches an architectural arrangement that enables routing of an optical system signal (fig. 3, 303, 305) at different optical layers (fig. 3, layers: Bands 1 to N) of an optical transport network, the optical system signal being constituted in a layered membership relationship that defines at least two optical layers (fig. 3, layers: Bands 1 to N), comprising: at least two optical transport lines residing in the optical transport network (fig. 3, 301, 306); a network switching site interconnecting the optical transport lines, the network switching site having at least one network switch and operable to route optical signals amongst the optical transport lines (fig. 5, 503 to 508); and a plurality of signal impairment compensation mechanisms distributed across each of the optical layers of the optical system signal at locations other than at the network switch, and operable across each of the optical layers of the optical system signal to perform a signal impairment compensation operation on optical signals therein (fig. 2, 202, 205_1 to 205_N).

Regarding claim 18, Bergano teaches that the signal impairment compensation operation is at least one of fixed gain flattening, dynamic gain flattening, optical transient suppression, dispersion compensation and polarization mode dispersion. In column 2, lines 16-20, Bergano discloses that the signal impairment compensation operation is dispersion compensation.

7. Claims 19-21, 23-25 are rejected under 35 U.S.C. 102(b) as being anticipated by Huber (US Patent No. 6,449,073).

Regarding claim 19, Huber teaches a method for routing optical signals in an optical transport network, comprising: receiving an optical system signal (fig. 1, 24_1) at a network switching site (fig. 1, 22) residing in the optical transport network, the optical system signal having a plurality of optical sub-band signals embodied therein; separating the optical system signal into the plurality of optical sub-band signals embodied therein (col. 5, lines 28-30); and routing at least one of the plurality of optical sub-band signals to a first optical transport line terminating at the network switching site (col. 5. lines 31-32), such that the at least one optical sub-band signal does not enter an electrical domain (col. 4, line 40-54, note that this is an all optical switch). In column 2, lines 50 to 59, Huber discloses that it has been an industry goal to develop switches to provide for high speed, all optical transmission systems, and in column 4, line 43, Huber discloses that the present invention is an optical transmission system.

Regarding claims 20 and 21, Huber discloses a step of routing a second optical sub-band signal of the plurality of optical sub-band signals to a second optical transport

line terminating at the network switching site (fig. 5 – a second system signal 24_2 is demultiplexed into a plurality of optical sub-band signals $16_{2,1}$-$16_{2,n}$ and is routed to a second optical transport line through $24'_2$), such that the second optical sub-band signal does not enter an electrical domain (col. 4, line 40-54, note that this is an all optical switch).

Regarding claim 23, Huber teaches a network switching node comprising: a first termination point operable to receive a first optical system signal (fig. 5, 24_1), the first optical system signal having a plurality of optical sub-band signals embodied therein (fig. 5, $16_{1,1}$-$16_{1,n}$); a demultiplexing component (fig. 5, 36) connected to the first termination point and operable to separate the first optical system signal into the plurality of optical sub-band signals embodied therein (fig. 5, $16_{1,1}$-$16_{1,n}$); and a multiplexing component (fig. 5, 42) operable to receive at least one of the plurality of optical sub-band signals from the demultiplexing component, whereby the at least one optical sub-band signal does not enter the electrical domain (col. 4, line 40-54, note that this is an all optical switch) in transit from the demultiplexing component to the multiplexing component (col. 2, lines 54-59).

Regarding claim 24, Huber teaches the network switching node of claim 23 further comprising a second optical termination point (fig. 5, $24'_1$) connected to the multiplexing component and operable to transmit a second optical system signal (fig. 5, $24'_1$) over the optical transport network, the second optical system signal having the at least one optical sub-band signal embodied therein (fig. 5, $16'_{1,1}$-$16'_{1,n}$).

Regarding claim 25, Huber teaches the network switching node of claim 23 further comprising a second multiplexing component (fig. 5, 42) operable to receive a second optical sub-band signal (fig. 5, $16'_{2,1}$-$16'_{2,n}$) from the demultiplexing component, whereby the second optical sub-band signal does not enter the electrical domain (col. 4, line 40-54, note that this is an all optical switch) in transit from the demultiplexing component to the second multiplexing component (col. 2, lines 54-59); and a third optical termination point (fig. 5, $24'_2$) connected to the second multiplexing component and operable to transmit a third optical system signal (fig. 5, $24'_2$) over the optical transport network, the third optical system signal having at least the second optical sub-band signal embodied therein.

8. Claims 19, 22, 23 and 26 are rejected under 35 U.S.C. 102(b) as being anticipated by Wu et al. (US Patent No. 6,545,783 B1).

Regarding claim 19, Wu teaches a method for routing optical signals in an optical transport network (fig. 1 – the optical signals are routed from the network input 10 to the network output 15), comprising: receiving an optical system signal at a network switching site residing in the optical transport network (fig. 1, 500), the optical system signal having a plurality of optical sub-band signals embodied therein; separating the optical system signal (fig. 1, 10) into the plurality of optical sub-band signals embodied therein (fig. 1, the band signals 11 and 12 are separated into a plurality of optical sub-band signals using demultiplexing components 102 and 103); and routing at least one of the plurality of optical sub-band signals to a first optical transport line terminating at the

network switching site (fig. 1, 500), such that the at least one optical sub-band signal does not enter an electrical domain (no O-E-O switching network is mentioned).

Regarding claim 22, Wu teaches the method of claim 19 the step of separating the optical system signal into the plurality of optical sub-band signals further comprises separating the optical system signal (fig. 1, 10) into a plurality of optical band signals (fig. 1, 11, 12) and separating the plurality of optical band signals into the plurality of optical sub-band signals (fig. 1 - the band signals 11 and 12 are separated into a plurality of optical sub-band signals using demultiplexing components 102 and 103).

Regarding claim 23, Wu teaches a network switching node (fig. 1, 500) residing in an optical transport network, comprising: a first termination point operable to receive a first optical system signal (fig. 1, 10), the first optical system signal having a plurality of optical sub-band signals embodied therein (fig. 1, the sub-band signals after being demultiplexed by demultiplexing component 102 and/or 103); a demultiplexing component (fig. 1, 101-105) connected to the first termination point and operable separate the first optical system signal into the plurality of optical sub-band signals embodied therein; and a multiplexing component (fig. 1, 111-115) operable to receive at least one of the plurality of optical sub-band signals from the demultiplexing component, whereby the at least one optical sub-band signal does not enter the electrical domain in transit from the demultiplexing component to the multiplexing component.

Regarding claim 26, Wu teaches the network switching node of claim 23 wherein the demultiplexing component (fig. 1, 102-105) further comprises a system level demultiplexer (fig. 1, 101) operable to receive the first optical system signal and

separate the first optical system signal into a plurality of optical band signals (fig. 1, 11, 12), and a set of demultiplexers (fig. 1, 102, 103) operable to receive the plurality of optical band signals (fig. 1, 11, 12) and separate the plurality of optical band signals into the plurality of optical sub-band signals (fig. 1, as stated above – the sub-band signals after being demultiplexed by demultiplexing components 102 and 103).

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. Claims 6-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamoto in view of Milton et al.

Nakamoto teaches all the limitations of claim 6 (see claim 5 rejection above) except for the step of separating the optical system signal into the plurality of intermediate optical signals at a network switching site associated with the optical transport network, the network switching site interconnecting a plurality of optical transport lines; and routing at least one of the plurality of intermediate optical signals to one of the plurality of optical transport lines. Milton discloses a system where the system signal (fig. 4, 2) is separated into a plurality of intermediate optical signals (fig. 4, 12, 13, 17) at a network switching site associated with the optical transport network (fig. 4, 115), the network switching site interconnecting a plurality of optical transport lines

(fig. 4, note transport lines exiting and entering cross-connect switching site); and routing at least one of the plurality of intermediate optical signals to one of the plurality of optical transport lines (fig. 4). One of ordinary skill in the art would have been motivated to incorporate a network switching site interconnecting a plurality of optical transport lines because a switching site allows for provisioning of lightpaths and the switching of a traffic stream from one line to another line in case one line fails. Therefore, it would have been obvious to an artisan at the time of invention that a network switching site interconnecting a plurality of optical transport lines of Milton be incorporated with the optical transport system of Nakamoto to provide provisioning and protection switching.

Regarding claim 7, Milton discloses that the step of routing at least one of the plurality of intermediate optical signals further comprises using an optical switch (fig. 4, 115 and col. 5 lines 59-60) residing at the network switching site.

Regarding claim 8, Milton discloses the step of routing at least one of the plurality of intermediate optical signals further comprises manually routing the at least one intermediate optical signal without the use of a switch (fig. 4, 13 and col. 5, lines 5-11) to a multiplexer residing at the network switching site.

Regarding claim 9, Milton discloses separating remaining intermediate optical signals into a plurality of remaining optical data signals (fig. 4 – the intermediate optical signals 12 from the demultiplexers 10 are separated into optical data signals 116 after passing through the optical cross-connect 115); routing the plurality of remaining optical data signals to a plurality of optical switches residing at the network switching site (an

optical cross connect can have a plurality of optical switches residing at the network switching site).

11. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Milton.

Milton teaches all the limitations of claim 15 (see claim 14 rejection above) except for a sub-band level multiplexing component associated with at least one of the second optical transport line and the third optical transport line, where at least one of the plurality of optical sub-band signals is manually routed without the use of a switch from the sub-band level demultiplexing component to the sub-band level multiplexing component. However, Milton does disclose a multiplexing component associated with at least one of the second optical transport line and the third optical transport line, where at least one of the plurality of optical band signals is manually routed without the use of a switch from the demultiplexing component to the multiplexing component (claim 13). One of ordinary skill in the art would have been motivated to manually route the plurality of optical sub-band signals, just as Milton manually routed the plurality of optical band signals to directly link one optical transport line to another optical transport line without the use of a switch, to provide versatility in handling network traffic. Therefore it would have been obvious to an artisan at the time of invention to incorporate not only manual routing on the band signal level, but also on the sub-band signal level.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David J. Lee whose telephone number is (571) 272-2220. The examiner can normally be reached on Monday - Friday, 7:30 am - 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

M. R. Sedighian

djl

M. R. SEDIGHIAN
PRIMARY EXAMINER